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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
10/047,992	01/17/2002	Hitoshi Ohashi	020052	5363	
23850 W.D.A.T.Z. OLIHA				EXAMINER	
KRATZ, QUINTOS & HANSON, LLP 1420 K Street, N.W.			TALBOT, BRIAN K		
Suite 400	N DC 20005	•	ART UNIT	PAPER NUMBER	
WASHINGTON, DC 20005			1792		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
	10/047,992	OHASHI ET AL.
Office Action Summary	Examiner	Art Unit
	Brian K. Talbot	1792
The MAILING DATE of this communication appeared for Reply	ppears on the cover sheet wi	ith the correspondence address
A SHORTENED STATUTORY PERIOD FOR REP WHICHEVER IS LONGER, FROM THE MAILING - Extensions of time may be available under the provisions of 37 CFR 1 after SIX (6) MONTHS from the mailing date of this communication. - If NO period for reply is specified above, the maximum statutory perio - Failure to reply within the set or extended period for reply will, by statuenty Any reply received by the Office later than three months after the mail earned patent term adjustment. See 37 CFR 1.704(b).	DATE OF THIS COMMUNIO 1.136(a). In no event, however, may a red will apply and will expire SIX (6) MON ute, cause the application to become AB	CATION. reply be timely filed ITHS from the mailing date of this communication. BANDONED (35 U.S.C. § 133).
Status		
 1) ⊠ Responsive to communication(s) filed on 22 2a) ⊠ This action is FINAL. 2b) ☐ The 3) ☐ Since this application is in condition for allow closed in accordance with the practice under 	nis action is non-final. rance except for formal matt	
Disposition of Claims		
4) ☐ Claim(s) <u>1,7,8,11,17,18 and 51-56</u> is/are per 4a) Of the above claim(s) is/are withdr 5) ☐ Claim(s) is/are allowed. 6) ☐ Claim(s) <u>1,7,8,11,17,18 and 51-56</u> is/are rejection of the company of the co	awn from consideration.	
Application Papers		
9) The specification is objected to by the Examin 10) The drawing(s) filed on is/are: a) according an applicant may not request that any objection to the Replacement drawing sheet(s) including the correct 11) The oath or declaration is objected to by the I	ccepted or b) objected to be drawing(s) be held in abeyar bection is required if the drawing	nce. See 37 CFR 1.85(a). (s) is objected to. See 37 CFR 1.121(d).
Priority under 35 U.S.C. § 119		
12) Acknowledgment is made of a claim for foreign a) All b) Some * c) None of: 1. Certified copies of the priority document 2. Certified copies of the priority document 3. Copies of the certified copies of the priority application from the International Bure * See the attached detailed Office action for a list	nts have been received. nts have been received in A jority documents have been au (PCT Rule 17.2(a)).	pplication No received in this National Stage
Attachment(s) 1) Notice of References Cited (PTO-892) 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) Information Disclosure Statement(s) (PTO/SB/08)	Paper No(s	Summary (PTO-413) S)/Mail Date Informal Patent Application

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- 1. The amendment filed 10/22/07 has been considered and entered. Claims 2-6,9,10,12-16 and 19-50 have been canceled. Claims 1,7,8,11,17,18 and 51-56 remain in the application.
- 2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
- 3. In light of the amendment filed 12/21/06, entered per filing the RCE, the 35 USC 112 second paragraph rejections over claims 1 and 11 have been withdrawn.
- 4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

5. Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711).

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Sterett et al. (5,746,844) teaches a method and apparatus for creating a three dimensional article using a layer-by-layer deposition of molten metal and annealing. The molten metal is applied by depositing the droplets in a predetermined pattern and rate (abstract).

Sterett et al. (5,746,844) fails to teach measuring and comparing data calculated by a monitoring device to control the deposited material.

Kudoh et al. (4,656,048) teaches a method of forming thick film circuit patterns with a sufficiently wide and uniform strip. The monitoring system measures and controls the distance of the nozzle from the substrate and compares that to a set value and performs and necessary changes to maintain the desired value (col. 2, lines 30-40, col. 3, line 55 – col. 4, line 35).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Sterett et al. (5,746,844) deposition process by incorporating a measuring/control system as evidenced by Kudoh et al. (4,656,048) to produce the desired circuit pattern.

Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) fail to disclosed the molten metal grains overlapping one another.

Tseng et al. (6,309,711) teaches a method of manufacturing a three-dimensional object whereby molten metal is jetted toward a substrate whereby the metal deposits are overlapping (abstract and Fig. 2).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Sterett et al. (5,746,844) in combination with Kudoh et al. (4,656,048) process by applying the molten metal material to be in overlapping fashion as

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evidenced by Tseng et al. (6,309,711) with the expectation of achieving the similar results, i.e. a conductive circuit.

Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711).

Orme-Marmerelis et al. (6,520,402) teaches a high speed direct writing with metallic microspheres. Small droplets of molten metal are generated toward a substrate to form conductive traces (abstract).

JP 10-226,803 teaches a three dimensional body formed by various kinds of materials.

Molten metal is spouted from a nozzle (10) to form droplets (20) that are applied to a substrate to form electric circuits (abstract).

Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 fail to teach measuring and comparing data calculated by a monitoring device to control the deposited material.

Features described concerning Kudoh et al. (4,656,048) above are incorporated here.

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 deposition process by incorporating a measuring/control system as evidenced by Kudoh et al. (4,656,048) to produce the desired circuit pattern.

Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) fail to disclosed the molten metal grains overlapping one another.

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Tseng et al. (6,309,711) teaches a method of manufacturing a three-dimensional object whereby molten metal is jetted toward a substrate whereby the metal deposits are overlapping (abstract and Fig. 2).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) process by applying the molten metal material to be in overlapping fashion as evidenced by Tseng et al. (6,309,711) with the expectation of achieving the similar results, i.e. a conductive circuit.

Claims 7,8,17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) further in combination with Pan (6,501,663).

Features described above concerning Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) are incorporated here.

Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) fail to specifically teach forming an insulating layer atop the molten layer.

Pan (6,501,663) teaches a three dimensional interconnect whereby an interconnect is covered with an insulator layer to protect the interconnect (abstract and Figs 5-7).

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Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) by incorporating an insulator layer atop the molten metal circuit layer as evidenced by Pan (6,501,663) with the expectation of achieving a multilayered structure or a protective layer for the circuitry.

Claims 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) still further in combination with JP 11-040937.

Features described above concerning references Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844), JP 10-226,803, Kudoh et al. (4,656,048) and Tseng et al. (6,309,711) are incorporated here.

Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP 10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et al. (6,309,711) fail to specifically teach using compressed air for jetting the molten metal and using a mask to deposit the molten metal on a desired location of the substrate.

JP 11-040937 teaches injecting compressed gas in a pot of molten solder to jet the solder through a mask and onto a substrate (abstract).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Orme-Marmerelis et al. (6,520,402), Sterett et al. (5,746,844) or JP

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10-226,803 in combination with Kudoh et al. (4,656,048) further in combination with Tseng et

al. (6,309,711) process by incorporating a compressed gas to aid in the jetting of molten metal as

well as the use of a mask to provide a desired pattern as evidenced by JP 11-040937.

While the Examiner acknowledges the fact that JP 11-040937 teaches molten metal

whereas the instant claims are directed toward a molten metal for circuitry, it is the Examiner's

position that the process disclosed is not limited to the material utilized. In fact, one skilled in

the art at the time the invention was made would have had a reasonable expectation of achieving

similar results with any molten "material".

Response to Amendment

6. Applicant's arguments filed 12/21/06 have been fully considered but they are not

persuasive.

Applicant argues that the prior art fails to "a method comprising the step of converting

the data of the coordinate system having the origin located at any position of the machine to a

second set of data associated with a reference coordinate system provided in the construction

member or on the intermediate member disposed on a transfer unit and having the origin in the

member provided,.., wherein the molten metal is jetted from a nozzle and both the nozzle and the

construction member have X, Y, Z axes perpendicular to each other, the nozzle being movable

along each of the X, Y, Z axes, the nozzle moving in a circumferential direction around each of

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the X axis and the Y axis, and the construction member being movable along each of the X, Y, Z axes and also in a circumferential direction around each of the X, Y, Z axes".

While the Examiner acknowledges this fact, it is the Examiner's position that one skilled in the art at the time the invention was made would have had a reasonable expectation of achieving similar success regardless of the "movement" in the X and Y directions as long as these directions are followed. If Applicant disagrees, then Applicant is invited to provide a showing of unexpected results regarding the criticality of the "circumferential" movement vs. no-circumferential movement. Even assuming a showing can be provided, the reference does not preclude the movement being in the circumferential motion and it is the Examiner's position that this would be met by the reference. No such showing has been provided to refute the Examiner's position.

Furthermore, it is the Examiner's position that the applied indeed teach movement in the X-axis, Y-axis and Z-axis. Orme-Marmerelis et al. (6,520,402) (Figs. 3A,3B and col. 7, lines 18-23), Sterett et al. (5,746,844) (col. 8, lines 11-40), Kudoh et al. (4,656,048) (col. 4, line 47-col. 5, line 20 and Fig. 14) and Pan (6,501,663) (Fig. 19 and col. 12, line 18 – col. 13, line 13) all teach movement of the substrate or coating nozzle in various X-axis ,Y-axis and Z-axis movement to produce three-dimensional coatings.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian K Talbot Primary Examiner Art Unit 1762

S REJULY 114/08

BKT